



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|-----------------------------|------------------------|
| 10/550,005 | 09/23/2005 | Takahiko Kondo | 01197.0257 | 5730 |
| 22852 | 7590 | 07/19/2007 | | |
| FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 901 NEW YORK AVENUE, NW WASHINGTON, DC 20001-4413 | | | EXAMINER CHANG, VICTOR S | |
| | | | ART UNIT 1771 | PAPER NUMBER |
| | | | MAIL DATE 07/19/2007 | DELIVERY MODE PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/550,005

Applicant(s)

KONDO ET AL.

Examiner

Victor S. Chang

Art Unit

1771

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2007.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
4a) Of the above claim(s) 2,3 and 6 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1,4,5 and 7-24 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Introduction

1. Applicants' amendments and remarks filed on 6/6/2007 have been entered. Claims 4, 5 and 7-12 have been amended. New claims 15-24 have been entered. Claims 4, 5, 7-12 and 15-24 are active.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. In response to the amendments, the grounds of rejections have been rewritten as set forth below.

Rejections Based on Prior Art

4. Claims 1, 4, 5 and 7-14 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Takita et al. [US 6245272], and evidenced by Concise Encyclopedia of Polymer Science and Engineering, pp. 354.

Takita's invention relates to a microporous polyolefin membrane for use as a battery separator [abstract; col. 2, lines 48-60; col. 3, lines 1-27]. The microporous polyolefin membrane comprises a blend B of an ultra-high-molecular-weight polyolefin B-1 having a weight-average molecular weight of 1.5×10^6 to 15×10^6 and a polyolefin B-2 having a weight-average molecular weight of 1×10^4 to 1×10^6 . Preferably, the blend B contains 15 to 40 w% of B-1 to provide sufficient strength. Useful polyolefins include crystalline homopolymers or copolymers of ethylene, propylene, or blends thereof. Examples of the polyolefins include high

Art Unit: 1771

density polyethylene (HDPE), etc. The membrane is formed by a melt extrusion process. Incorporation of propylene ethylene copolymer improves melt-down temperature and the characteristics of the membrane for battery separators.

For claims 1, 4 and 13, Takita is silent about: 1) the α -olefin co-monomer content of a HDPE copolymer and its melt index (MI); 2) the viscosity average molecular weight (Mv) of a HDPE; 3) the Mv and the total α -olefin co-monomer content of the blend. However, regarding 1), since it is well known that a HDPE is a polymer of ethylene copolymerized with propylene (α -olefin) for a controlled density and properties, as evidenced by the reference Concise Encyclopedia of Polymer Science and Engineering, selecting a HDPE having a workable propylene (α -olefin) content as Takita's B-2 component is deemed to be either anticipated, or obviously provided by practicing the invention of prior art, motivated by the desire to obtain a melt extrudable blend. Similarly, regarding the MI property, since Takita discloses the same subject matter of a polymer blend for the same end use, a workable MI is also deemed to be either anticipated, or obviously provided by practicing Takita's invention. Regarding 2), since the Takita teaches a blend of HDPE over a range of molecular weights, which inherently correspond to a range of viscosity average molecular weights Mv, selecting a HDPE with a workable range of Mv is deemed to be either anticipated by Takita, or an obviously provided by practicing the invention of prior art. Regarding 3), since Takita teaches a blend comprising HDPE, and discloses the same subject matter for the same end use (a HDPE blend for making a microporous battery separator), a workable Mv and total α -olefin co-monomer content in the blend are also deemed to be either anticipated by Takita, or an obvious optimization to one of

Art Unit: 1771

ordinary skill in the art, motivated by the desire to obtain the beneficial properties such as melt processibility of a HDPE blend.

For claim 5, since Takita teaches a HDPE over a broad range of molecular weights, which inherently corresponds to a broad range of M_v , a blend of multiple M_v is also deemed to be either anticipated, or obviously provided by practicing the invention of prior art, because it is *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.

For claims 7 and 8, since Takita teaches the same subject matter for the same use (microporous battery separator made of a polyethylene blend), workable rupture and shrinkage force of the battery separator are deemed to be either anticipated by Takita, or an obvious optimization to one of ordinary skill in the art of battery separator, motivated by the desire to obtain required properties dictated by end use.

For claim 9, since Takita teaches that a polymer capable of imparting a shut-down function at low temperature is included for lithium battery separators [col. 3, lines 58-61], a workable fusing temperature limit is deemed to be either anticipated by Takita, or an obvious optimization to one of ordinary skill in the art of a lithium battery separator, motivated by the desire to obtain a required safety feature for the end use.

For claim 10, Takita teaches that the final membrane has a thickness of 5 to 250 μm [col. 6, line 20].

For claim 11, Takita teaches that the membrane has a porosity of 45 to 95% [col. 4, line 3].

Art Unit: 1771

For claim 12, Takita teaches that the membrane has an air permeability of 50 to 400 sec/100 cc [col. 4, line 55].

For claims 14, Takita teaches that blend B contains 15 to 40 w% of B-1 to provide sufficient strength, and B-1 has a weight-average molecular weight of 1.5×10^6 to 15×10^6 . Further, a low-density polyethylene is incorporated to impart a shut-down function for the battery separator. The low-density polyethylene (LDPE) useful for the present invention includes ethylene/ α -olefin copolymer, etc. [col. 3, lines 13-20]. A workable amount of LDPE is deemed to be either anticipated by Takita, or an obvious optimization to one of ordinary skill in the art of a lithium battery separator, motivated by the desire to obtain a required safety feature for the end use.

For newly added claims 15-24, absence of any unexpected end use properties, the various battery separator properties are deemed to be either anticipated by Takita, or obviously provided by practicing the invention of prior art for the same end use.

Response to Argument

5. Applicants argue at Remarks pages 7-11 the grounds of rejections under 35 USC 102(b) and 103(a) separately, and state that the prior art fails to anticipate the present invention.

However, applicants are reminded that the rejection is made under 102(b)/103(a), because the prior art discloses all the essential structure and composition limitations, except certain specific properties or functions, which are deemed to be dictated by the same end use, rejection under 102(b)/103(a) is appropriate. More particularly, while the prior art is silent about the claimed properties or functions, the reasoning of 102(b) rejection is that these properties or functions are

Art Unit: 1771

deemed to be necessarily disclosed in the choice of meeting the inherent requirement dictated by the same end use.

Applicants argue at pages 8-9 that Takita et al. does not disclose propylene ethylene copolymer. However, it is well known that a HDPE is a polymer of ethylene copolymerized with propylene (α -olefin) for a controlled density and properties, as evidenced by the reference Concise Encyclopedia of Polymer Science and Engineering. There is nothing whatsoever preventing one of ordinary skill in the art to select a common HDPE comprising a workable content of propylene (α -olefin) to make Takita's microporous membrane, motivated by the desire to obtain the beneficiary effects provided by the propylene co-monomer.

Applicants argue at pages 10-11 that it would not be possible for a person skilled in the art to predict the advantages of the claimed features in view of Takita et al. and the Encyclopedia, and points to Example 1 and Comparative Example 6 as evidence that one skilled in the art would not have been able to predict the improved results. However, since Takita's teachings encompass the essential structure and composition of the present invention, and they are for the same end use, workable ranges of various properties or functions are deemed to be obvious routine optimization to one skilled in the art of battery separator. The Examples are illustration that useful end products can be obtained by routine experimentations within the general disclosure of Takita.

Conclusion

Art Unit: 1771

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

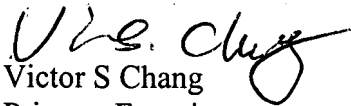
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor S. Chang whose telephone number is 571-272-1474. The examiner can normally be reached on 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel H. Morris can be reached on 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1771

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Victor S Chang
Primary Examiner
Art Unit 1771

7/16/2007